MAR 1 9 2002 &

2623 #2 131 03274

Washington, D.C. 20231, on <u>March 12, 2002.</u>

Signature: UML Reddrek

RECEIVED
MAR 2 1 2002
Technology Center 2600

**PATENT** 

Attorney Docket No. NTI-024 (745)

#### IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION
A (TT *
Art Unit: unknown
Examiner: unknown

### **INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §1.97**

Assistant Commissioner for Patents Washington, D.C. 20231

Sir:

Listed below or on an attached Form PTO-1449 is information known to applicant(s). A copy of each listed publication and U.S. and foreign patent, except for pending U.S. applications, is being submitted herewith, along with a concise explanation of information in a foreign language, if any, pursuant to 37 C.F.R. §1.97-1.98.

Applicants respectfully request that the listed information be considered by the Examiner and be made of record in the above-identified application. If form PTO-1449 is enclosed, the Examiner is requested to initial and return it in accordance with MPEP § 609.

This statement is not intended to represent that a search has been made or that the information cited in the statement is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56.

$\boxtimes$	This st	This statement qualifies under 37 C.F.R. § 1.97, subsection (b) because (check all that apply):				
		(1)	•		he application filing date and is other than a cation under § 1.53(d)	
		(2)	It is being filed within 3	3 months of 6	entry of a national stage	
	$\boxtimes$	(3)		he mail date	of the first Office Action on the merits.	
		(4)			f a first Office Action after the filing of a request for er § 1.114	
	mailing	g date of		ce action und	fter the period specified in § 1.97(b), but before the der § 1.113, a notice of allowance under § 1.311, or plication, then:	
		a certif	fication as specified in §	1.97(e) is pro	ovided below; or	
			f \$180.00 as set forth in \{ nt of other papers filed to		uthorized below, enclosed, or included with the this statement.	
	37 C.F.R. § 1.97(d). If this statement is being filed after the period specified in § 1.97(c), but on or be payment of the issue fee, then:				fter the period specified in § 1.97(c), but on or before	
	A.	a certif	fication as specified in §	1.97(e) is con	mpleted below; and	
	B.		f \$180.00 as set forth in { nt of other papers filed to		uthorized below, enclosed, or included with the this statement.	
Fee Authorization. Applicant believes no fee is due. However, should a fee be found to be or Commissioner is hereby authorized to charge any fees associated with this communication to Account No. 50-0574 (Docket No. NTI-024).				· · · · · · · · · · · · · · · · · · ·		
				Res	spectfully submitted,	
				BE	VER, HOFFMAN & HARMS, LLP	
Data da	N ( 1.	12 200	2	D		
Dated:	March	12, 2002	<u>4</u>	By:	Jeanette S. Harms, Reg. No. 35,537	
-	one: (40 ner No.	•	5907			

INFORMATION DISCLOSURE

MAR 1 9 2002 BTO-1449

Atty. Docket No.

Serial No.

NTI-024

09/941,453-6364

**Applicant** 

CHANG, Fang-Cheng

Filing Date

Group

8/28/2001

Not Yet Assigned Range Too

211	<b>PATENT</b>	DOCTIA	MENTS.
U.O.	IAILIII	DUCUN	

						Ö
EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILIN <b>O</b> DATE
	5,326,659	7/5/1994	Liu, et al.	430	5	3/5/1992
	5,340,700	8/23/1994	Chen, et al.	430	312	11/3/1993
	5,432,714	7/11/1995	Chung, et al.	364	525	9/2/1994
, , <del>, , , , , , , , , , , , , , , , , </del>	5,572,598	11/5/1996	Wihl, et al.	382	144	2/25/1994
	5,795,688	8/18/1998	Burdorf, et al.	430	30	8/14/1996
	5,801,954	9/1/1998	Le, et al.	364	488	4/24/1996
	5,804,340	9/8/1998	Garza, et al.	430	5	12/23/1996
	5,815,685	9/29/1998	Kamon	395	500	9/15/1995
	5,825,647	10/20/1998	Tsudaka	364	167.03	3/12/1996
	5,849,440	12/15/1998	Lucase, et al.	430	5	1/29/1997
	5,862,058	1/19/1999	Samuels, et al.	364	491	5/16/1996
	5,900,338	5/4/1999	Garza, et al.	430	5	8/15/1997
	6,009,250	12/28/1999	Ho, et al.	395	500.06	9/30/1997
	6,009,251	12/28/1999	Ho, et al.	395	500.06	9/30/1997
	6,011,911	1/4/2000	Ho, et al.	395	500.06	9/30/1997
	6,078,738	6/20/2000	Garza, et al.	395	500.22	5/8/1997
	6,081,659	6/27/2000	Garza, et al.	395	500.22	4/26/1999
	6,171,731 B1	1/9/2001	Medvedeva, et al.	430	5	1/20/1999

EXAMINER:	Date Considered:	

INFORM O 1 P MAR 1 9 2	201 ATTON 2002 PTO-1449	CLOSURE	Atty. Docket No.  NTI-024  Applicant  CHANG, Fang-C  Filing Date  8/28/2001	Group	No. 941,453-636	eg	HECE: 12002	SENEU
FOREIGN PATENT DOCUMENTS								
EXAMINER'S INITIALS	PATENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	YES	NO	
	WO 00/36525 A2	6/22/2000	wo .					
	WO 00/67074 A1	11/9/2000	wo					
	WO 00/67075 A1	11/9/2000	wo					
	WO 00/67076 A1	11/9/2000	wo					

Considered:

INFORMATION DISCLOSURE
OVECITATION
/ 🖔 📆
MAR 1 9 2002 PGO-1449

Atty. Docket No.

NTI-024

Serial No.

09/941,453-636

**Applicant** 

CHANG, Fang-Cheng

Filing Date

Group

8/28/2001

Not Yet Assigned

### OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.) CITATION **EXAMINER'S INITIALS** Cobb, et al., "Fast Sparse Aerial Image Calculation for OPC", SPIE, Vol. 2621, pp. 534-544. Stirniman, J., et al., "Spatial Filter Models to Describe IC Lithographic Behavior", Precim Corporation, Portland, Oregon (10 pages). Sugawara, M., et al., "Defect Printability Study of Attenuated Phase-Shifting Masks for Specifying Inspection Sensitivity", Sony Corporation, Kanagawa, Japan (16 pages). Adam, K., et al., "Simplified Models for Edge Transitions in Rigorous Mask Modeling", University of California Berkeley (40 pages). Gordon, R., et al., "Mask Topography Simulation for EUV Lithography", FINLE Technologies Inc. (15 pages). Pistor, T., "Rigorous 3D Simulation of Phase Defects in Alternating Phase-Shifting Masks", Panoramic Technology Inc. (13 pages). Semmier, A., et al., "Application of 3D EMF Simulation for Development and Optimization of Alternating Phase Shifting Masks", Infineon Technologies AG (12 pages). Wong, A., et al., "Polarization Effects in Mask Transmission", University of California Berkeley (8 pages). Neureuther, A., et al., "Modeling Defect-Feature Interactions in the Presence of Aberrations", University of California Berkeley (10 pages). Casey, Jr., J.D., et al., "Chemically Enhanced FIB Repair of Opaque Defects on Molybdenum Silicide Photomasks", SPIE, Vol. 3236, pp. 487-497 (1997). Mathur, B.P., et al., "Quantitative Evaluation of Shape of Image on Photoresist of Square Apertures", IEEE, Transactions On Electron Devices, Vol. 35, No. 3, pp. 294-297, March 1988. Neureuther, A., "Modeling Phase Shifting Masks", SPIE, 10th Annual Symposium On Microlithography, Vol. 1496, pp. 80-85 Henke, W., et al., "A Study of Reticle Defects Imaged Into Three-Dimensional Developed Profiles of Positive Photoresist Using the Solid Lithography Simulator", Microelectronics Eng., Vol. 14, pp. 283-297 (1991). Wiley, J., et al., "Phase Shift Mask Pattern Accuracy Requirements and Inspection Technology", SPIE, Integrated Circuit Metrology, Inspection, And Process Control V, Vol. 1464, pp. 346-355 (1991).

EXAMINER:	Date Considered:
·	

INFORMATION DISCLOSURE
OIP ECITATION
S 1440
MAR 1 9 2002PT O-1449
THE PROPERTY OF THE PARTY OF TH

Atty. Docket No.

NTI-024

Serial No.

Group

09/941,453-6364

**Applicant** 

CHANG, Fang-Cheng

**Filing Date** 

8/28/2001

Not Yet Assigned

# - PRCKING CONE TOO OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.) CITATION EXAMINER'S **INITIALS** Ham, Y.M., et al., "Dependence of Defects in Optical Lithography", Jpn. J. Appl. Phys., Vol. 31, pp. 4137-4142 (1992). Ohtsuka, H., et al., "Phase Defect Repair Method for Alternating Phase Shift Masks Conjugate Twin-Shifter Method", Jpn. J. Appl. Phys., Vol. 31, pp. 4143-4149 (1992). Watanabe, H., et al., "Detection and Printability of Shifter Defects in Phase-Shifting Masks II Defocus Characteristics", Jpn. J. Appl. Phys., Vol. 31, pp. 4155-4160 (1992). Crisalle, O., et al., "A Comparison of the Optical Projection Lithography Simulators in SAMPLE and PROLITH", IEEE, Transactions On Semiconductor Manufacturing, Vol. 5, No. 1, pp. 14-26, February 1992. Nistler, J., et al., "Phase Shift Mask Defect Printability Analysis", Proceedings Of The Microlithography Seminar INTERFACE '93, OCG Microelectronic Materials, Inc., pp. 11-28 (1993). Rieger, M., et al., "System for Lithography Proximity Compensation", Precim Company, Portland, Oregon, September 1993 (28 pages). Wiley, J., et al., "Device Yield and Reliability by Specification of Mask Defects", Solid State Technology, Vol. 36, No. 7, pp. 65-66, 70, 72, 74, 77, July 1993. Nistler, J., et al., "Large Area Optical Design Rule Checker for Logic PSM Application", SPIE, Photomask And X-Ray Mask Technology, Vol. 2254, pp. 78-92 (1994). Pati, Y.C., et al., "Phase-Shifting Masks for Microlithography: Automated Design and Mask Requirements", J. Opt. Soc. Am., Vol. 11, No. 9, pp. 2438-2452, September 1994. Spence, C., et al., "Automated Determination of CAD Layout Failures Through Focus: Experiment and Simulation", SPIE, Vol. 2197, pp. 302-313 (1994). Qian, Q.D., et al., "A New Scalar Planewave Model for High NA Lithography Simulations", IEEE, pp. 45-48 (1994). Karklin, L., "A Comprehensive Simulation Study of the Photomask Defects Printability", SPIE, Vol. 2621, pp. 490-504 (1995). Wiley, J., et al., "The Effect of Off-Axis Illumination on the Printability of Opaque and Transparent Reticle Defects", SPIE, Vol. 2512, pp. 432-440 (1995). Brunner, T., et al., "Approximate Models for Resist Processing Effects", SPIE, Vol. 2726, pp. 198-207, March 1996.

EXAMINER	:	Date Considered:	

INFORMATION DISCLOSURE	
OIPEGITATION	
MAR 1 9 2002 (C) O-1449	

RADEMARK

Atty. Docket No.

NTI-024

Serial No.

09/941,453-6364

**Applicant** 

CHANG, Fang-Cheng

Group

**Filing Date** 

8/28/2001

Not Yet Assigne

## 6364 RC CHIND ON CONDING SAN OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.) **EXAMINER'S** CITATION INITIALS Chang, K., et al., "Accurate Modeling of Deep Submicron Interconnect Technology", TMA Times, Vol. IX, No. 3 (1997). Gans, F., et al., "Printability and Repair Techniques for DUV Photomasks", SPIE, Proceedings Of The 17th Annual Symposium On Photomask Technology And Management, Vol. 3236, pp. 136-141 (1997). Ibsen, K., et al., "Clear Field Reticle Defect Diposition for Advanced Sub-Half Micron Lithography", SPIE, Proceedings Of The 17th Annual Symposium On Photomask Technology And Management, Vol. 3236, pp. 124-135 (1997). Pati, Y.C., et al., "Exploiting Structure in Fast Aerial Image Computation for Integrated Circuit Patterns", IEEE Transactions On Semiconductor Manufacturing, Vol. 10, No. 1, pp. 62-74, February 1997. Vacca, A., et al., "100nm Defect Detection Using a Dynamically Programmable Image Processing Algorithm", SPIE, Vol. 3236 (1997) (Abstract Only). Kubota, H., et al., "A Fast Method of Simulating Resist Pattern Contours Based on Mean Inhibitor Concentration", Jpn. J. Appl. Phys., Vol. 37, pp. 5815-5820 (1998). Vacca, A., et al., "100nm Defect Detection Using an Existing Image Acquisition System", SPIE, Vol. 3236, pp. 208-21 (1998). Fukuda, H., et al., "Determination of High-Order Lens Aberration Using Phase/Amplitude Linear Algebra", J. Vac. Sci. Technol. B, Vol. 17, No. 6, pp. 3318-3321, November/December 1999. Fukuda, H., "Node-Connection/Quantum Phase-Shifting Mask: Path to Below 0.3um Pitch, Proximity Effect Free, Random Interconnects and Memory Patterning", J. Vac. Sci. Technol. B, Vol. 17, No. 6, pp. 3291-3295, November/December 1999. Balasinski, A., et al., "A Novel Approach to Simulate the Effect of Optical Proximity on MOSFET Parametric Yield", IEEE, pp. 37.6.1-37.6.4 (1999). Balasinski, A., et al., "Comparison of Mask Writing Tools and Mask Simulations for 0.16um Devices", IEEE, SEMI Advanced Semiconductor Manufacturing Conference, pp. 372-377 (1999).

EXAMINER:	Date Considered: